

REMARKS

Claims 1-16 are pending in the application. In the Office Action at hand, those claims are rejected.

Claims 1-14 and 16 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over Claims 3, 4, and 14-18 of U.S. Pat. No. 6,755,028. In response to the double patenting rejection, a Terminal Disclaimer is filed concurrently herewith. Accordingly, removal of the double patenting rejection is respectfully requested.

Claims 1-3, 8-10 and 16 are rejected over 35 U.S.C. § 102(b) as being anticipated by Grant (EP 0233784). In addition, Claims 4-7, 11-14 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Grant and Bachler (U.S. Patent No. 4,757,689). In response to the Section 102(b) and 103(a) rejections, the Applicants respectfully submit that Claims 1-16 are not anticipated or obvious in view of Grant and Bachler.

Base Claim 1 recites a method of controlling a vacuum gauge including determining that a potentially dangerous condition may be present in a vacuum system and preventing a vacuum gauge from being turned on. Independent Claim 16 similarly recites a vacuum system.

Base Claim 8 recites a vacuum system including a vacuum pump, a pressure gauge coupled to the vacuum pump, and an electronic controller in communication with the pressure gauge and the vacuum pump. The controller responds to a potentially dangerous condition that may be present in the vacuum pump by preventing a vacuum gauge from being turned on.

An embodiment of the invention will be described for illustrative purposes without limitation. Referring to Figs. 1-3, in one embodiment of the claimed invention, a vacuum pressure gauge 86 can be coupled to the interior of a vacuum vessel 20 of a cryopump for measuring gas pressure. The cryopump can have first stage 50 and second stage 54 heat stations which are connected to respective cryopump surfaces 64/70 and 62. Temperature sensor elements 58 and 60 can be mounted to stations 50 and 54 for sensing the temperature of the stations. Operation of the cryopump can be controlled by an electronic module 24. The vacuum pressure gauge can be prevented from being turned on when there may be a potentially dangerous condition present in the cyropump.

During operation of the cryopump, such as during regeneration, a potentially dangerous condition can exist, for example, by the presence of ignitable gases in the vacuum vessel 20, such as H_2/O_2 , which can be ignited by the vacuum gauge when turned on. To avoid turning on the vacuum gauge during such a potentially dangerous condition, the gauge can be turned on only if the second stage temperature is below 20K, or if the cryopump has been purged, for example, with an inert gas, such as nitrogen. If the temperature is below 20K, there typically is insufficient ignitable gas to ignite, and if the cryopump has been purged, typically only inert gas is present. If neither condition exists, a potentially dangerous condition may be present and the gauge can be prevented from turning on.

In contrast, Grant discloses a vacuum monitoring apparatus in Figs. 2-5 having a hot cathode ionization gauge for measuring pressure below 10^{-3} torr and a thermal conductivity gauge for measuring pressure above 10^{-3} torr. The hot cathode ionization gauge includes an electron emitting filament 2, and the thermal conductivity gauge includes a thermal conductivity gauge filament 3. Referring to Fig. 5, a signal indicative of the gas pressure surrounding the thermal conductivity gauge filament 3 is provided to controller 57. If the gas pressure is above a set point, a trip signal is sent to gauge controller 60 to prevent power from being sent to the electron emitting filament 2 of the hot cathode ionization gauge. Operation of the filament 2 when the gas pressure is too high can damage the filament 2.

Grant does not teach the determination of a potentially dangerous situation in a vacuum system and the prevention of turning on a vacuum gauge based on that determination. Instead, Grant only teaches preventing operation of one of the two gauges under conditions that might damage that gauge.

Accordingly, Claims 1-3, 8-10, and 16 are not anticipated by Grant, since Grant does not teach or suggest "determining that a potentially dangerous condition may be present in a vacuum system; and preventing a vacuum gauge from being turned on," as recited in base Claim 1, or "the controller responding to a potentially dangerous condition that may be present in the vacuum pump by preventing the vacuum gauge from being turned on," as recited in base Claim 8, or "means for determining that a potentially dangerous condition may be present in a vacuum system; and means for responding to the potentially dangerous condition by preventing a vacuum

gauge from being turned on," as recited in Claim 16. Therefore, Claims 1-3, 8-10, and 16 are in condition for allowance. Reconsideration is respectfully requested.

Bachler discloses a cryopump having a pressure sensor 41. Bachler does not teach or suggest that the pressure sensor 41 can be prevented from being turned on when a potentially dangerous condition may be present in a vacuum system.

Accordingly, Claims 4-7, 11-14 and 15 are not obvious in view of Grant and Bachler, since neither reference, alone or in combination, teaches or suggests "determining that a potentially dangerous condition may be present in a vacuum system; and preventing a vacuum gauge from being turned on," as recited in base Claim 1, or "the controller responding to a potentially dangerous condition that may be present in the vacuum pump by preventing the vacuum gauge from being turned on," as recited in base Claim 8. Therefore, Claims 4-7, 11-14 and 15 are in condition for allowance. Reconsideration is respectfully requested.

Particular notice should be taken of Claims 5-7 and 12-14, which recite particular conditions considered to be not dangerous such that the vacuum gauge may be turned on. In particular, Claims 5, 6, 12 and 13 recite that the conditions are not dangerous when the cryopump is below a temperature set point. With respect to those claims, the Examiner has, without citing a prior art teaching, stated that the temperature set point is a design choice and not critical. To the contrary, at page 12 of the specification, lines 5-6, it is stated that if the second stage temperature is below 20k there is insufficient gas in the pump to ignite. With that teaching, one skilled in the art will understand that the gas would have been captured on the very low temperature cryopump array. There is no suggestion in any of these cited references that being below any temperature, much less 20K, would indicate a safe condition for turning on a pressure gauge.

With respect to claims 7 and 14, the Examiner has pointed to Bachler, et al. as suggesting that inert gas is not a dangerous condition. However, there is no teaching in Bachler, et al. that a condition of a cryopump being substantially filled with inert gas indicates a condition at which a vacuum gauge may be turned on.

Information Disclosure Statement

A Supplemental Information Disclosure Statement (IDS) is being filed concurrently herewith. Entry of the IDS is respectfully requested.

CONCLUSION

In view of the above remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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